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NEW JAPANESE FUNGI

NOTES AND TRANSLATIONS—VI

Tyôzaburô Tanaka

Uncinula curvispora K. Hara sp. nov. (in litt.).

Uncinula septata Salm. var. *curvispora* K. Hara var. nov. in Dainippon Sanrin Kwaihô (Journ. Forestry Asso. Japan) Tôkyô, **392**: 62. T. 4, vii Jul. 1915. (Japanese.)

Spots obsolete, hypophyllous; mycelia spreading in thin film-like overgrowth, fugacious; perithecia punctiform, scattered, flat-discoidal or conspicuously compressed into scale form, 170–220 μ (aver. 200 μ) diam., black; perithecial wall membranaceous, cells small and irregular, sometimes more or less radiating, 4–8 μ wide; appendages numerous, 200–300 altogether, filiform, simple, smooth, thin-walled, 35–200 μ long, 4–11 septate throughout, the basal half yellowish-brown, 6–7 μ across, gradually narrowed toward the apex, 2–2.5 μ across near the hyaline ends, apex coiled spirally; asci 3–5 to one perithecium, ellipsoid or ovoid, rounded at the apex, beaked, below, walls rather thick but brittle, 65–75 × 37–50 μ; ascospores 4–5, ellipsoid, ovoid, or ovoid-reniform, both ends rounded, yellowish, unicellular, granular inside, 28–35 × 12–15 rarely 45 × 18 μ.

On *Fagus sylvatica* var. *Sieboldi.*

Locality and distribution: Not given.

Notes: In a letter from Mr. Hara, received shortly before by the writer, a very peculiar habit of this fungus is described, which caused him to determine to raise this as a species. He found that the perithecia at maturity behaved always to turn over on their heads holding the substratum with their appendages exactly like the perithecia of *Phyllactinia corylea* do with the second appendages. He proposes a new subgenus *Asterothecia* to which the species belong, characterized by another noteworthy peculiar form of flattened perithecia.

Uncinula geniculata Gerard var. *carpinicola* K. Hara var. nov. in Dainippon Sanrin Kwaihô (Journ. Forestry Assoc. Japan) Tôkyô, no. 392, p. 62, 63, 1 text fig. on p. 64 (to the right) T. 4, vii, Jul. 1915. (Japanese.)

Amphigenous; mycelia persistent or evanescent, thin, filmy; hyphae filamentous, colorless, branching, septate, 3–4 μ across; perithecia gregarious or scattered, spheroid or depressed-spheroid, 70–100 μ diam.; perithecial walls membranaceous, dark-brown, composed of cells 10–18 μ wide; appendages 16–20 altogether, delicate, filiform, straight or inflexed about the middle, continuous, glabrous, equally thickened, spirally helicoid at the apex, 150–440 × 6–7 μ; asci 6–8 in one perithecium, ellipsoid or ovoid, unicellular, hyaline, one or two nucleate at the middle, 15–20 × 9–11 μ.

On *Carpinus* sp.

Locality and distribution: Not given.

Figures (woodcut) give the shape of appendages.

Differs from the type by having (1) amphigenous and much smaller perithecia, (2) very long appendages measuring 1.5 to 4 times as long as the perithecium and in numbers and dimensions of asci and ascospores.

UNCINULA NECATOR (Schw.) Burr. var. *Actinidiae* K. Hara comb. nov. in Dainippon Sanrin Kwaihô (Journ. Forestry Assoc. Japan) Tôkyô, no. 392, p. 63–64, 1 text fig. on p. 64 (middle). T. 4, vii, Jul. 1915. (Japanese.)

U. Actinidiae Miyabe ex Salm. Monogr. Eris. 101. 1900 (nom. nud.).

Spots amphigenous, white or cinereous, irregular, somewhat pulverulent; mycelia thin, effused, persistent or evanescent; hyphae filamentous, branched, septate, 3–4 μ diam.; perithecia amphigenous, scattered or gregarious, spheroid or complanate-spheroid, 80–120 μ, average 100 μ diam.; cells forming perithecial wall 10–20 μ, rarely 23 μ wide, dark-brown; appendages 10–23, linear, simple or rarely forked, 3–7 septate or continuous, colorless above, usually 6–8 μ across, strongly helicoid at the apex, swollen at the base with diam. 9–13 μ, total length 100–250 μ, commonly, 200 μ; asci 4–6, ovoid, ellipsoid or spheroid, beakless or occasionally beaked, 50–60 × 35–40 μ, spherical ones 50 μ diam.; ascospores 4–6, hyaline, ellipsoid or ovoid, 18–23 × 10–13 μ.

On *Actinidia polygama* and *Actinidia Kolomikta*.

Locality and distribution: Not given.

Illustrations (woodcut) gives appendages, ascus, and ascospores. In comparison, several appendages of *U. necator* from wine grape are figured to the left hand.

Note: Salmon states that the occurrence of this fungus on *Actinidia* in Japan suggests that native locality of grape mildew disease in the Orient (Monogr. Erisiph. 1900, p. 101), but Hara considers there is evidently a considerable morphological difference between this and the typical *U. necator,* the former being characterized by short, stout, subrigid appendages, with distinct swollen bases, and by typically beakless asci.

MICROSPHAERA ALNI (Wallr.) Salm. forma Quercus-glanduliferae K. Hara forma nov. in Dainippon Sanrin Kwaihô (Journ. Forestry Assoc. Japan) Tôkyô, **392**: 64 Jul. 1015. (Japaneses.)

Appendages once branch dichotomously about the middle. Other characters same as type.

On *Quercus glandulifera.*

Locality and distribution not given.

MACROPHOMA CORCHORI Sawada sp. nov. in Taiwan Nôjihô (Formosan Agric. Review) Taihoku, 120: 868–871. T. 5, xi, Nov. 1916. (Japanese.)

Spots indefinite; mycelia corticolous or lignicolous, occasionally formed in medulla, colorless; hyphae aseptate, branching, 3–8 μ across, freely passing through the host cells; pycnidia subepidermal, punctiform, black, with ostiola erumpent, spheroid, depressed-spheroid or ovoid, often sub-confluent, 98–225 × 89–275 μ; cells forming perithecial wall multiserial, black; ostiola with round openings 15 μ in diam.; conidiophores numerous, densely coarctate, cylindric, somewhat tapering toward the apex, simple, straight or slightly curved, continuous, hyaline, 10–14 × 2.5–3.5 μ, terminated by a single pycnospore; pycnospores ovoid-oblong, oblong-ellipsoid or short-clavate, rounded at the apex, obsuse at the base, straight or slightly curved, smooth, unicellular, finely guttulate, hyaline, 16–32 × 7–10 μ.

On *Corchorus capsularis* (jute).

Locality: Formosa (widely distributed).

Notes: The diseases of jute have not yet been well studied by pathologists even though the plant is so important as a source of textile fiber. Sawada states that this dieback disease is one of the most devastating jute diseases in Formosa and the annual loss is sometimes recorded as 30–40% of the total crop. The only remedy for this is said to be to avoid an insufficient supply of potash in the soil, and Bordeaux mixture was shown to be no protection against the disease.

Sawada gives (on p. 864) five more species of fungi attacking the jute plant in Formosa, among which two are new, that is, *Phyllosticta Corchori* Sawada sp. nov., *Hymenula nigra* Sawada sp. nov., *Hypochnus centrifugus* (Lév.) Tul., *Sphaeroptheca fuliginea* (Schlecht) Pollacci, and *Rhizoctonia Solani* Kuehn.

PERONOSPORA CHENOPODII-FICIFOLII Sawada sp. nov. in Taiwan, Sôtokufu Nôji Shikenjô (Agr. Exp. Sta. Formosa) Circular. Publication No. 101, p. 9–10, 15, figs. 6–10, June, 1916 (Japanese): in Taiwan Nôjihô (The Formosan Agr. Review) No. 155, p. 29, 32, figs. 6–10. June 20, 1916. (Japanese.)

Hypophyllous, forming a pale-purplish-gray growth on the under surface of leaves, discoloration rather prominent, pale-yellow, round or irregular, about 1–27 mm. in diam., sometimes covering entire under surface; hyphae intercellular, colorless, aseptate, 7–12 μ across haustoria simple or branched at the tips, mostly more or less spiral, 10–20 × 3–4 μ; conidiospores caespitose from stromata, 240–500 × 8–14 4μ, 3–6-rarely 7-times dichotomously branching, all branches extremely curved, average of main stem and branches first to fifth orders measuring respectively 310.4 × 10.5, 33.9 × 6.5, 27.6 × 5.9, 24.1 × 4.5, 16.4 × 3.8, and 10.2 × 3.4 μ; conidia oblong or somewhat ellipsoid, papillate at the basal ends, fuliginous or cinereous, 26–36 × 17–25 (average 30.6 × 20.9), germinate with germ tubes; germ tubes not conspicuously swollen at the base, 4–7 μ.

Oögonial stage not known.

On *Chenopodium ficifolium*, parasitic, Taiwan (Formosa), common.

PERONOSPORA EFFUSA (Grev.) Ces. var. *minor* Casp.) on *Spinacia oleracea* (spinach: Hôrensô in Japanese) and *Peronospora Chenopodii* Casp. (=*p. effusa* var. *major* Casp.) on *Chenopodium album* are also studied, and inoculation experiments proved the independence of all of these three species. Morphologically, this species differs from *P. effusa* in having (1) spots more intensely colored, (2) hyphae in host tissues thicker with more or less spiral haustoria, (3) curved branches of conidiophore much longer in every respect, (4) papillate conidia more intensely colored, and much longer, (5) germ tubes not conspicuously swollen at the base; from *P. chenopodii* in having (1) more loose and less branching conidiophores, the main stems of which appear more slender, (2) conidia much longer, mostly oblong.

The present idea regarding the omnivorous nature of peronosporaceous fungi will have to be greatly altered, as is proved in this case by inoculation experiments which show an entire lack of relationship among species occurring on closely related host plants, even growing in the same field. Sawada also succeeded in making the following three independent species from what has been known as the lettuce downy mildew fungus, *Bremia Lactucae,* which attacks 66 species belonging to 24 genera so far as has been described.

(1) BREMIA SONCHI K. Sawada sp. nov. in Shokubutsugaku Zasshi (Botan. Magaz.) Tôkyô, **28**^{326}: 80–83. Text fig. 2. Feb., 1914. (Japanese.)

Foliicolous or caulicolous; spots small, polygonal, rarely cover entire surface in lower leaves; aërial hyphae usually scanty, arachnoid when appearing on lower leaves; intercellular hyphae hyaline, continuous, finally granulate, 8–17 μ; haustoria spherical, occasionally obovoid or subclavate, 11–24 × 7–13 μ conidiophores caespitous from stomata, whole length 230–560 μ, upper half 3–6 times dichotomously branching, the dimension of main stem, and branches of first to fourth orders respectively measuring 286 × 9, 74 × 8, 65 × 6, 52 × 4, 43 × 3.5 μ, basal portion of main stem somewhat swelling, each branch rather slender, curved, rarely 1-septate throughout the conidiophore, swellings of terminal branches spherical, 2–6 sterigmate, sterigmata 4–7 × 2.5–3 μ, terminated by single standing conidia; conidia mostly globose, occasionally obovoid, flat-papillate above, small-pedicellate below, containing protoplasm highly reflecting light, 17–24 × 13–21 μ, germinate in 2 hours; germ tubes 3.5–6 μ diam., varying in thickness through the growth.

On *Sonchus oleraceus.*

Locality: Taiwan (Formosa). Common.

Illustration: One woodcut figure showing conidiophore, haustoria and conidia.

Inoculation result is only positive on above plant, negative on *Crepis japonica, Lactuca debilis, Lactuca laciniata, Lactuca scariola* var. *sativa* (Lettuce), *Arctium Lappa, Hemistepta carthamoides, Sonchus oleraceus,* and *Taraxacum platycarpum.*

Chief morphological difference from *B. Lactucae* lies in (1) the situation of lowest branch of conidiophore nearly at the middle, not at one-third or one-fifth of the whole length as in *B. Lactucae,* (2) the form of disk of terminal branches of conidiophore nearly spherical instead of disk-shaped.

(2) BREMIA SAUSSUREAE Sawada sp. nov. l. c. p. 80–83. Text fig. 2.

Foliicolous; spots pale-yellowish, polygonal, about 15 mm. broad, forming a dense white growth on the under surface of leaves; intercellular hypae running through mesophyll tissues, granulate, 8–17 μ across; haustoria ovoid, obovoid, or irregular, 14–27 × 5–14 μ; conidiophore single or caespitose from stomata, very long, 270–1021 μ, 3–6 dichotomously branching, branches all short and stout, the dimension of main stem and branches of first to fourth orders measuring respectively 622 × 10, 57 × 8, 37 × 7, 28 × 5, 18 × 4 μ, septate (usually 5–6), swellings of terminal branches 4–6 sterigmate, sterigmata 6–10 × 3 μ, terminated by single standing conidia; conidia conspicuously large, broadly ellipsoid to elongate-oblong, flat-papillate above, pedicellate below, granulate, 24–57 × 18–28 μ, hyaline, germinate in 2 hours, germ tubes 4.5–7 μ across, not uniform in diameter.

On *Hemistepta carthamoides* (=*Saussurea affinis* not Spreng.).

Locality: Taiwan (Formosa). Common.

Illustration: One woodcut text figure showing conidiophore, conidia, and haustoria.

Inoculation experiment negative on *Crepis japonica, Sanchus oleraceus, Lactuca debilis, Lactuca scariola* var. *sativa, Lactuca laciniata, Arctium Lappa,* and *Taraxacum platycarpum.*

(3) BREMIA OVATA Sawada sp. nov. l. c. p. 83–84. Text fig. 3.

Hyphae 7 μ across; conidiophores caespitose, total length almost 1 mm., 3–8 times dichotomously branching, usually 7–8 septate, main stem comparatively long, branches short, average dimension of main stem and branches of first to fifth orders measuring respectively 591 × 8, 55 × 6, 52 × 5, 44 × 3.5, 24 × 3, 13 × 3 μ; swelling a terminal branch spherical or top-shaped, 3–7 sterigmate; sterigma 6–8 μ long; conidia ovoid or oblong-ovoid, minutely pedicellate below, apical papilla obsolete, 14–18 × 10–13 μ, hyaline, granulate, germinate with germ tubes; germ tubes 3.5–4 μ across, nearly uniform in thickness.

On *Crepis japonica,* occurring with *Protomyces Inonyei* P. Henn.

Locality: Taiwan (Formosa). Rare.

Illustration: One woodcut text figure showing conidiophore and conidia.

Sufficient material was not secured to make inoculation experiments. The species is characterized by the very short terminal branch of the conidiophore, the long main stem, ovoid conidia, and uniform growth of germ tubes.

HELICOBASIDIDUM MOMPA N. Tanaka forma *macrosporum* K. Hara form. nov. in Dainippon Sanshi Kwaihô (Journ. Seric. Assoc. Japan) Tôkyô. **26**^{308}: 725. T. 6. ix. Sept., 1917. (Japanese.)

Sporidia oblong-ovoid, straight or curved, rounded at the apex, gradually pointing toward the base, 15–25 × 6–8 μ, average 18 × 7 μ.

On *Morus*.

Locality: Not given.

This form is to be distinguished from the typical "Mompa" fungus, which has much smaller sporidia, measuring 10–15 × 5–7 μ. (N. Tanaka, in Journ. Coll. Sci., Tôkyô. **4**^{1}: 194. 1891.)

On account of the absence of protobasidia, the species belongs to *Helicobasidium* instead of to *Septobasidium*, to which it was transferred by Raciborski in 1909 (Bull. Int. Ac. Sci. Cracovie; Math.-Nat., Ann. 1909: 365).

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